

The following Listing of Claims replaces all prior listings, and versions, of claims in the subject patent application.

Listing of Claims:

1. (Withdrawn) An actuator component for a drop on demand ink jet printer, said component comprising a body having a top surface, an opening in said top surface extending in an opening direction into said body along an opening axis, an actuator structure located substantially within said opening and an electrode, said electrode being disposed so as to be able to apply a field to said actuator structure to cause said actuator structure to deform.
2. - 3. (Canceled)
4. (Withdrawn) A component according to Claim 1, wherein said actuator structure extends as an impermeable wall across said opening.
5. (Withdrawn) A component according to Claim 1, wherein said actuator structure tapers along said opening axis.
6. (Withdrawn) A component according to Claim 5, wherein said actuator structure comprises a flat portion at the end of said taper; said flat portion comprising an upper surface and a lower surface; said upper and lower surfaces lying parallel with said top and bottom surfaces.
7. - 8. (Canceled)

9. (Withdrawn) A component according to Claim 6, wherein both said top surface and said bottom surface can move in said opening direction.

10. (Canceled)

11. (Withdrawn) A component according to any Claim 1, wherein a plurality of openings is provided; each of said openings comprising a respective actuator structure.

12. -14 (Canceled)

15. (Withdrawn) A component according to Claim 1, wherein said opening is elongate in a direction perpendicular to said opening axis, said opening being a channel.

16. - 19. (Canceled)

20. (Withdrawn) A component for ejecting a droplet in a direction of droplet flight, said component comprising an actuator structure displaceable by actuation in the direction of said droplet flight; said actuator defining in part an ejection chamber and comprising a port through which said droplet is ejected.

21. (Withdrawn) A component according to Claim 20, further comprising an electrode, said electrode being disposed so as to be able to apply a field to said actuator structure to cause said actuator structure to deform.

22. (Withdrawn) A component according to Claim 20, wherein said actuator structure comprises elongate channel walls defining an elongate channel.
23. (Withdrawn) A component according to Claim 22, wherein said actuator structure provides a convex cross section when a cross section is taken orthogonal to the channel length.
24. (Withdrawn) A component according to Claim 23, wherein said port is provided in the roof of said convex cross-section.
25. (Withdrawn) A component according to Claim 22, wherein said actuator structure cross section tapers in said direction of droplet flight.
26. (Withdrawn) A component according to Claim 25, wherein said actuator comprises a flat portion at the end of said taper; said flat portion comprising an upper surface and a lower surface; said upper and lower surfaces lying on planes orthogonal to said direction of droplet flight.
27. (Withdrawn) A component according to Claim 20, wherein said actuator structure is homogenous.
28. (Withdrawn) A component according to Claim 20, wherein said actuator structure is mounted to a base; said base providing one wall of said ejection chamber.

29. (Withdrawn) A method of forming a component for an ink jet print head comprising the steps of a) providing a body having a mold feature, b) forming a deformable actuator structure, the shape of said actuator structure being defined, at least in part by said mold feature, c) removing at least a portion of said mold feature, and d) providing an electrode, said electrode being disposed so as to be able to apply a field to said actuator structure to cause said actuator structure to deform while said actuator structure is attached to said body.

30. (Withdrawn) A method according to Claim 29, wherein said mold feature is provided by adding a material to a surface of said body.

31. (Withdrawn) A method according to Claim 30, wherein said surface is a top surface.

32. (Withdrawn) A method according to Claim 30, wherein said surface is a surface bounding an opening extending into said body.

33. (Withdrawn) A method according to Claim 30, wherein said material is a photoresist.

34. (Withdrawn) A method according to Claim 29, wherein said mold feature is provided by removing material from a surface of said body.

35. (Withdrawn) A method according to Claim 34, wherein said material is removed by etching.

36. (Withdrawn) A method according to Claim 29, wherein the step of forming said electrode comprises a first step of forming a first electrode layer and a second step of forming a second electrode layer.

37. (Withdrawn) A method according to Claim 36, wherein said first electrode layer is formed before forming said deformable actuator structure.

38. (Withdrawn) A method according to Claim 37, wherein in the step of forming said actuator structure, said electrode is immersed in a suspension comprising dispersed particles.

39. (Withdrawn) A method according to Claim 38, wherein said dispersed particles comprise piezoelectric material.

40. (Withdrawn) A method according to Claim 38 comprising immersing a deposition electrode in said suspension with said electrode, and applying a voltage therebetween and thereby depositing said dispersed particles on said electrode.

41. (Withdrawn) A method according to Claim 36, wherein said second electrode layer is formed after forming said deformable actuator structure.

42. (Withdrawn) A method according to Claim 29, comprising removing at least a portion of said mold feature by etching.

43. (Withdrawn) A method according to Claim 29, comprising removing at least a portion of said mold feature by washing.
44. (Withdrawn) A method according to Claim 29, comprising removing at least a portion of said mold feature by application of heat.
45. (Previously presented) A method of forming a component for an ink jet print head comprising the steps of a) providing a body having a top surface, b) forming a plurality of openings in said top surface and extending into said body, and c) forming within each said opening an actuator structure; each said actuator structure remaining attached to said body during actuation.
46. (Original) A method according to Claim 45, wherein said actuator structures are isolated actuator structures.
47. (Canceled)
48. (Previously presented) A method according to Claim 45, comprising forming said opening by etching material from said top surface.
49. (Previously presented) A method according to Claim 48, comprising applying a mask to the body and wherein the opening thus formed tapers with increasing depth.

50. (Previously presented) A method according to Claim 45, comprising applying an electrode to an inner surface of said opening.

51. (Previously presented) A method according to Claim 50, comprising immersing said electrode in a suspension comprising dispersed particles.

52. (Original) A method according to Claim 51, wherein said dispersed particles comprise piezoelectric material.

53. (Previously presented)) A method according to Claim 51, comprising immersing a deposition electrode in said suspension with said first electrode, and applying a voltage therebetween and thereby depositing said dispersed particles on said first electrode.

54. (Previously presented) A method according to Claim 53, comprising heating said deposited dispersed particles to form said actuator structure.

55. (Previously presented) A method according to Claim 45, comprising the steps supplying a slurry comprising particles within said opening, the slurry at least partly conforming to the shape of said opening.

56. (Original) A method according to Claim 55, wherein said particles are of a piezoelectric material.

57. (Previously presented) A method according to Claim 55, comprising heating said slurry to form said actuator structure.

58. (Previously presented) A method according to Claim 45 to Claim 49, comprising laying a flexible sheet of a piezoelectric material within said opening by applying a pressure difference thereto; said sheet at least partly conforming to the shape of said opening.

59. (Previously presented) A method according to Claim 58, comprising heat treating said sheet to form said actuator structure.

60. (Previously presented) A method according to Claim 45, comprising depositing a film of piezoelectric material within said opening using a sputtering process; said film at least partly conforming to the shape of said opening.

61. (Previously presented) A method according to Claim 59, wherein said sputtering process comprises three metal targets of lead, titanium and zirconium.

62. (Previously presented) A method according to Claim 60, comprising heat treating said film to form said actuator structure.

63. (Withdrawn) A channelled component for a drop on demand ink jet printer comprising elongate channel walls defining a plurality of elongate liquid channels, each channel comprising

one wall that is resiliently deformable in an actuation direction orthogonal to the channel length; a respective ejection nozzle connected with the channel at a point intermediate its length; a liquid supply providing for continuous flow of liquid along said channel; acoustic boundaries at respective opposite ends of the channel serving to reflect acoustic waves in the liquid of the channel wherein the inter-channel spacing of said acoustic boundaries is different to the inter-channel spacing of said nozzles.

64. (Withdrawn) A channelled component according to Claim 63, wherein the inter-channel spacing of said acoustic boundaries is less than that of the inter-channel spacing of said nozzles.

65. (Withdrawn) A channelled component according to Claim 63, wherein channels are chevron-shaped.

66. (Withdrawn) A channelled component according to Claim 65, wherein a series of chevron-shaped channels is arranged to one side of a straight channel, the angle of said chevron-shaped channels being more acute with increasing distance from said straight channel.

67. (Withdrawn) A channelled component according to Claim 66, wherein a reversed second series of chevron-shaped channels is arranged on the opposite side of said straight channel.

68. (Withdrawn) A channelled component according to Claim 63, wherein said channels are arranged on a tile, an array of nozzles extending linearly across said tile.

69. (Withdrawn)) A channelled component according to Claim 68, wherein a plurality of like tiles are butted together along respective edges and wherein there is provided an array of nozzles having an equal linear nozzle spacing across the width of the like tiles and across the butt joint.

70. (Withdrawn) A channelled component according to Claim 69, wherein said respective edges are serrated.

71. (Withdrawn) A channelled component according to Claim 70, wherein the serrations of respective edges are interleaved.

72. - 73. (Canceled)

74. (Withdrawn) A component according to Claim 1, wherein said opening defines at least in part an ink jet chamber.

75. (Withdrawn) A component according to Claim 28, wherein said body is formed of silicon or alumina.